

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

JOHANNES MEERDINK
NILS DAN ANDERS SÖDERGARD

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For: PURIFICATION PROCESS FOR
LACTIDE

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Examiner: Raymond K. Covington

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(2007-580-US-01)

CUSTOMER NO. 23720

APPEAL BRIEF

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants hereby submit this Appeal Brief to the Board of Patent Appeals and Interferences in response to the final Office Action dated October 28, 2009.

The Director is authorized to deduct the fee for filing an Appeal Brief and any additional fees under 37 C.F.R. §§ 1.16 to 1.21 from Williams, Morgan & Amerson, P.C. Deposit Account No. 50-0786/2144.000800RE.

I. REAL PARTY IN INTEREST

The real party in interest is Tate & Lyle PLC, having a place of business at Sugar Quay, Lower Thames Street, London EC3R 6DQ, United Kingdom.

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF THE CLAIMS

Claims 1-21 are pending, rejected, and the subject of this appeal.

IV. STATUS OF AMENDMENTS

There are no unentered amendments.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1 relates to a process for the purification of lactide from a crude lactide vapor product stream comprising at least lactide, lactic acid, water and linear lactic acid oligomers, the crude lactide vapor product stream being produced by depolymerization of low molecular weight polylactic acid in a reactor. Page 3, lines 27-32. The process comprises feeding the vapor product stream to a rectification column having a feed inlet at the lower end of the column and an overhead vapor outlet at the upper end of the column, through the feed inlet. Page 3, lines 33-36. In the process, the column is mounted onto the reactor such that components from the vapor product stream liquefying within the column are allowed to flow back into the reactor. Page 3, lines 36-39; page 6, lines 15-21. The process also comprises establishing at the upper end of the column a first overhead vapor fraction consisting essentially of water, lactic acid and lactide, and

at the lower end of the column a high-boiling fraction consisting essentially of lactide and higher-boiling linear lactic acid oligomers. Page 4, lines 1-5. Additionally, the process comprises condensing from the first overhead vapor fraction by means of a condenser at least the lactide to obtain a first liquid lactide containing condensate fraction. Page 4, lines 6-8. Further, the process comprises removing the first liquid lactide containing condensate fraction. Page 4, lines 9-10.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Are claims 1-21 unpatentable under 35 U.S.C. § 103(a) over O'Brien, et al., US 5,521,278 ("O'Brien") and Drysdale, et al., US 5,236,560 ("Drysdale")?

VII. ARGUMENT

1. Claims 1-21 are patentable under 35 U.S.C. § 103(a) over O'Brien and Drysdale

A. Introduction

According to MPEP 2142, to reach a proper determination of obviousness under 35 U.S.C. §103(a), the examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention "*as a whole*" would have been obvious at that time to that person (emphasis added). Knowledge of applicant's disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the "differences," conduct the search and evaluate the "*subject matter as a whole*" of the invention (emphasis added). The tendency to resort to "hindsight" based upon applicant's disclosure is often difficult to avoid due

to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

Guidance in following the process of determining the obviousness of a claim has been provided by recent United States case law, specifically, *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). To quote the Supreme Court in a relevant passage from *KSR* (emphases added):

The principles underlying these cases are instructive when the question is whether a patent claiming the combination of elements of prior art is obvious. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida [v. AG Pro, Inc.]*, 425 U.S. 273 (1976)] and *Anderson's-Black Rock [, Inc. v. Pavement Salvage Co.]*, 396 U.S. 57 (1969)] are illustrative—a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.

Following these principles may be more difficult in other cases than it is here because the claimed subject matter may involve more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement. Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit. See *In re Kahn*, 441 F. 3d 977, 988 (CA Fed. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness").

As should be apparent from the above quotation from *KSR*, the Supreme Court only discussed combinations of *known* elements. This understanding of the Court's decision is

recognized by the Office in MPEP 2141, which only refers to "familiar elements," "known methods," "a structure already known in the prior art," "substitution of one element for another known in the field," "a combination of known elements," etc.

The Supreme Court in *KSR* did *not* overturn prior precedent that *unknown* elements *cannot* form a basis for a rejection under 35 U.S.C. § 103(a). "Obviousness cannot be predicated on what is unknown." *In re Newell*, 13 U.S.P.Q.2d (BNA) 1248, 1250 (Fed Cir. 1989), quoting *In re Spormann*, 150 U.S.P.Q. (BNA) 449, 452 (C.C.P.A. 1966); *In re Rijckaert*, 28 U.S.P.Q.2d (BNA) 1955, 1957 (Fed. Cir. 1993), also quoting *Spormann*, at 452. "[O]ne cannot choose from the unknown." *In re Ochiai*, 37 U.S.P.Q.2d (BNA) 1127, 1131 (Fed. Cir. 1995), quoting *In re Mancy*, 182 U.S.P.Q. (BNA) 303, 306 (C.C.P.A. 1974). The Supreme Court's decision in *KSR* is in accord with precedent that, to establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. M.P.E.P. § 706.02(j); *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974); *In re Lee*, 61 U.S.P.Q.2d 1430 (Fed. Cir. 2002).

B. Claims 1-21 contain claim limitations neither taught nor suggested by O'Brien, Drysdale, or both

Claim 1, and all claims dependent thereon (claims 2-21), recite elements unknown in view of O'Brien and Drysdale. Therefore, claims 1-21 are patentable under 35 U.S.C. § 103(a) over these references. The reasons for this conclusion are set forth below.

Claim 1 recites, among other elements, feeding the vapor product stream to a rectification column having a feed inlet at the lower end of the column and an overhead vapor outlet at the upper end of the column, through the feed inlet, *the column being mounted onto the reactor such*

that components from the vapor product stream liquefying within the column are allowed to flow back into the reactor (emphasis added).

Neither O'Brien nor Drysdale teach or suggest such a rectification column, let alone one mounted on the reactor as recited.

According to O'Brien, crude lactide is generated by thermally-induced depolymerization (cracking) in a cracking vessel (900). (See Figures 1A and 1B, and column 11, line 28 through column 13, line 6.) The fraction containing major amounts of lactide is removed from the cracking vessel, is condensed (1000), and the resulting liquid is thereafter purified by distillation (1400). In order to provide the desired, polymer-grade lactide product, the concentrated lactide obtained from the distillation must then be subjected to melt-crystallization (2000). Thus, it is clear that O'Brien fails to disclose a process according to the present invention since: (1) there is no rectification column mounted on a lactide reactor in a manner such that condensate from the column can be continuously returned to the reactor; and (2) there is no vapor-phase purification of crude lactide.

In other words, O'Brien teaches that any vapor stream from the reactor should be fed via a first line 25 to a condensor 1000, and the condensate from the condensor is fed via a further line 43 to a distillation column 1400. O'Brien, col. 11, line 46 to col. 13, line 2 and Figures 1A and 1B. Any material in the vapor stream from the reactor is liquefied (condensed) in a condensor, then distilled. Thereafter, the liquefied or condensed material remaining after distillation undergoes hydrolysis or dehydration prior to being recycled to the reactor. Col. 12, lines 26 to col. 13, line 28. The person of ordinary skill in the art would understand O'Brien's condensation, distillation, and hydrolysis or dehydration steps to require affirmative steps involving the application of energy and the use of at least three pieces of equipment (condensor,

distiller, and hydrolysis or dehydration vessel) to recycle liquefied or condensed material from the vapor stream exiting the reactor back to the reactor. Thus, O'Brien fails to teach or suggest recycling involving the elimination of any one or more of those steps, let alone using a rectification column mounted onto the reactor such that components from the vapor product stream liquefying within the column are allowed to flow back into the reactor.

Drysdale is discussed in the present specification, with reference to its European counterpart (EP0630371), at page 2, lines 16-30, and page 6, line 15-22. According to Drysdale, a crude lactide stream from a depolymerization unit (where depolymerization is again carried out by cracking) is condensed and the resulting liquid (condensate) is fed through a line (line 2) to a distillation column. (See Figure 1, and column 5, line 67 through column 6, line 7.) Thus, it is clear that Drysdale also fails to disclose a process according to the present invention since: (1) there is no rectification column mounted on a lactide reactor in a manner such that condensate from the column can be continuously returned to the reactor; and (2) the feed stream to the purification step (distillation) is a liquid condensate and is not a vapor.

In other words, the person of ordinary skill in the art would conclude from Drysdale that a vapor stream from Drysdale's reactor should be fed to a partial condenser; the resulting condensate stream should be fed to a distillation column 1; and a vapor lactide-rich fraction should be removed from the lower part of the column via line 4. Drysdale, col. 4, line 45 to col. 6, line 15; and Figure 1. Thereafter, the liquefied or condensed material remaining after distillation undergoes further condensing and fractionating. Col. 6, lines 17-22. The person of ordinary skill in the art would understand Drysdale's condensation, distillation, further condensation, and fractionation steps to require affirmative steps involving the application of energy and the use of at least four pieces of equipment (condensor (not shown), distillation

column 1, further condensor 5, and fractionation column 8) being performed on the liquefied or condensed material from the vapor stream exiting the reactor. Thus, Drysdale fails to teach or suggest recycling, let alone recycling involving the elimination of any one or more of those steps, further let alone using a rectification column mounted onto the reactor such that components from the vapor product stream liquefying within the column are allowed to flow back into the reactor.

To summarize, using a rectification column mounted onto the reactor such that components from the vapor product stream liquefying within the column are allowed to flow back into the reactor is an element of the present claims unknown over O'Brien and Drysdale. Because the Supreme Court in *KSR* only addressed claims combining known elements, such cases as *In re Newell*, 13 U.S.P.Q.2d (BNA) 1248, 1250 (Fed Cir. 1989), *In re Spormann*, 150 U.S.P.Q. (BNA) 449, 452 (C.C.P.A. 1966); *In re Rijckaert*, 28 U.S.P.Q.2d (BNA) 1955, 1957 (Fed. Cir. 1993), *In re Ochiai*, 37 U.S.P.Q.2d (BNA) 1127, 1131 (Fed. Cir. 1995), *In re Mancy*, 182 U.S.P.Q. (BNA) 303, 306 (C.C.P.A. 1974); *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974); *In re Lee*, 61 U.S.P.Q.2d 1430 (Fed. Cir. 2002) remain precedential, as recognized by the Office in MPEP 2141. Therefore, because obviousness cannot be predicated on what is unknown, and/or O'Brien and Drysdale fail to teach or suggest all the claim limitations, claims 1-21 are patentable over O'Brien and Drysdale.

C. Examiner's errors

The Examiner made a number of factual errors and/or legal errors during the course of prosecution. Applicants will discuss a number of factual errors and/or legal errors below. Applicants will not necessarily discuss every factual error and/or legal error. Regardless,

Applicants submit the present claims are patentable over O'Brien and Drysdale for reasons set forth in this Appeal Brief.

In the Office Action mailed October 28, 2009, the Examiner argued at pp. 2-3 that O'Brien teaches a functional equivalent to the rectification column mounted on the depolymerization reactor of the present invention, namely, at col. 2, step E. However, the Examiner's alleged "functional equivalent" is nothing of the sort. He argues column 2, step E, of O'Brien, which teaches condensation of a vaporous reaction mixture removed in step D from a cracking zone, is equivalent to the rectification column being mounted in relation to the depolymerization reactor (noting that the term "condensation" is equivalent to the term "liquefaction"). It is clear from O'Brien's Figures 1A-1B and the accompanying discussion at col. 11, line 27 to col. 13, line 28 that O'Brien's step E refers to activities performed in the condensor 1000 and the vacuum distillation column 1400 of Figure 1B. These activities occur far downstream of the cracking unit 900 of Figure 1A. This certainly cannot be considered equivalent to the liquefaction that takes place in the rectification column of the present claims, wherein the liquefying components are allowed to flow back into the depolymerization reactor.

The Examiner further argues that column 3, step C of O'Brien corresponds to step (c) of present claim 1. First, Applicants point out that the Examiner selected steps from two different aspects of O'Brien's teachings. O'Brien's first aspect is discussed at col. 2, lines 25-67, and includes step E discussed above. O'Brien's second aspect is discussed at col. 3, lines 1-30, and includes the step C referred to in this paragraph. The Examiner's picking and choosing from the two different aspects of O'Brien, without any recognition of differences between the aspects that would complicate any actual combination of elements of the two aspects hypothetically

contemplated by the person of ordinary skill in the art, indicates a failure to establish a *prima facie* case of obviousness.

Further examination, though, reveals why the Examiner picked and chose from two different aspects of O'Brien. Above, he applied step E of O'Brien's first aspect as the alleged equivalent of liquefaction within the rectification column of the present claims, e.g., step (a) of claim 1. Here, he applied step C of O'Brien's second aspect as the alleged equivalent of condensing a vapor fraction, e.g., step (c) of claim 1. However, step E of O'Brien's first aspect and step C of O'Brien's second aspect *teach the same thing*. To make this point utterly clear, we present the two steps side-by-side:

O'Brien, Step E, first aspect, col. 2, lines 58-62	O'Brien, Step C, second aspect, col. 3, lines 17-23
Condensing the vaporous reaction mixture and fractionating the condensate therefrom whereby lactic acid, water and minor amounts of lactide are removed as vapor overhead, concentrated lactide is removed as a liquid side stream and the heavy ends are removed as molten liquid	Condensing the vaporous reaction mixture and fractionating the condensate therefrom whereby lactic acid, water and minor amounts of lactide are removed as vapor overhead, concentrated lactide is removed as a liquid side stream and the condensate heavy ends are removed as molten liquid

It is therefore utterly plain that the Examiner is attempting to argue one teaching of O'Brien--that of condensing a vaporous reaction mixture and fractionating the resulting condensate--is the equivalent of two different steps of the present invention (e.g., steps (a) and

(c) of claim 1). This is clearly improper, and the rejection should be withdrawn for at least this reason alone.

In fact, a correct reading of O'Brien reveals that both step E of the first aspect and step C of the second aspect are each equivalent to steps (c) and (d) of Claims 1, 5, and 6 of the present invention. Applicants have acknowledged that these downstream features are known in other contexts (see present application, paragraph bridging pages 8-9).

In the Office Action mailed October 28, 2009, the Examiner also argued at p. 3 that "recycling reaction components back to a reactor is an obvious expedient well-known to a person of ordinary skill in the distillation chemical arts." Applicants note that by making this statement, the Examiner recognized that O'Brien fails to teach a process for the purification of lactide from a crude lactide vapour product stream being produced by depolymerisation of low molecular weight polylactic acid in a reactor, comprising use of a rectification column being mounted onto the reactor such that components from the vapour product stream liquefying within the column are allowed to flow back into the reactor.

Further, the Examiner's statement that recycling reaction components is "an obvious expedient well-known to a person of ordinary skill in the distillation chemical arts" founders on at least two points.

First, as discussed above, it remains settled and binding precedent that the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). Conclusory statements regarding common knowledge and common sense are insufficient to support a finding of obviousness. *In re Lee*, 61 U.S.P.Q.2d 1430 (Fed. Cir. 2002) at 1434-35. Because the Examiner's statement lacks

any supporting evidence, it is a conclusory statement and insufficient to support a finding of obviousness.

Second, any recycling known to the person of ordinary skill in the art from O'Brien and Drysdale involves condensation, distillation, and hydrolysis or dehydration steps. See the discussion of O'Brien, above. Thus, the only recycling techniques that could be an "obvious expedient" to the person of ordinary skill in the art having O'Brien and Drysdale before him or her require affirmative steps involving the application of energy and the use of at least three pieces of equipment (condensor, distiller, and hydrolysis or dehydration vessel) to recycle liquefied or condensed material from the vapor stream exiting the reactor back to the reactor. This is in stark contrast to the use of a rectification column being mounted onto the reactor such that components from the vapor product stream liquefying within the column are allowed to flow back into the reactor, as is recited by claim 1 and all claims dependent thereon.

D. Summary

In view of the foregoing discussion, claims 1-21 are patentable under 35 U.S.C. § 103(a) over O'Brien and Drysdale.

VIII. CLAIMS APPENDIX

The claims that are the subject of the present appeal – claims 1-21 – are set forth in the attached “Claims Appendix.”

IX. EVIDENCE APPENDIX

There is no separate Evidence Appendix for this appeal.

X. RELATED PROCEEDINGS APPENDIX

There is no Related Proceedings Appendix for this appeal.

XI. CONCLUSION

All pending claims under consideration, claims 1-21, are in condition for allowance.

Appellants therefore pray that the rejections be REVERSED and the claims allowed to issue.

Respectfully submitted,

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April 13, 2010

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AGENT FOR APPELLANTS

CLAIMS APPENDIX

1. A process for the purification of lactide from a crude lactide vapour product stream comprising at least said lactide, lactic acid, water and linear lactic acid oligomers, said crude lactide vapour product stream being produced by depolymerisation of low molecular weight polylactic acid in a reactor, which process comprises the steps of:

- (a) feeding said vapour product stream to a rectification column having a feed inlet at the lower end of the column and an overhead vapour outlet at the upper end of the column, through the said feed inlet, said column being mounted onto the reactor such that components from the vapour product stream liquefying within the column are allowed to flow back into the reactor;
- (b) establishing at the upper end of the column a first overhead vapour fraction consisting essentially of water, lactic acid and lactide, and at the lower end of the column a high-boiling fraction consisting essentially of lactide and higher-boiling linear lactic acid oligomers;
- (c) condensing from said first overhead vapour fraction by means of a condenser at least the lactide to obtain a first liquid lactide containing condensate fraction;
- (d) removing the first liquid lactide containing condensate fraction.

2. A process according to claim 1, wherein step (c) comprises partially condensing said first overhead vapour fraction, such that at least the water is left in the vapour phase and removed from the condenser.

3. A process according to claim 1, wherein step (c) comprises partially condensing said first overhead vapour fraction, such that at least the water and a major amount of the lactic acid are left in the vapour phase and removed from the condenser.

4. A process according to claim 1, wherein said first liquid lactide containing condensate fraction comprises at least 90 wt.% lactide and 0-10 wt.% lactic acid, preferably at least 96 wt.% lactide and 0-4 wt.% lactic acid.

5. A process according to claim 1, wherein the first liquid lactide containing condensate fraction of step (d) is subjected to one or more distillation steps.

6. A process according to claim 5, wherein said one or more distillation steps comprise the steps of:

- (i) feeding the first liquid lactide containing condensate fraction into a distillation column, the column having a bottom end and a top end and a feed inlet between said bottom end and top end, the column further comprising a second overhead vapour outlet at the top end of the column, a liquid outlet at the bottom end and a vapour side outlet located between the feed inlet and the liquid outlet;
- (ii) establishing
 - a second overhead vapour fraction comprising lactic acid in the top end of the column,
 - a bottom vapour fraction comprising lactide in the bottom end of the column, and
 - a bottom liquid fraction below the bottom vapour fraction comprising lactide and linear lactic acid oligomers;
- (iii) removing second overhead vapour fraction through the overhead vapour outlet;
- (iv) removing bottom vapour fraction through the vapour side outlet;
- (v) removing bottom liquid fraction at the liquid outlet.

7. A process according to claim 6, further comprising the step of (vi) condensing the bottom vapour fraction comprising lactide obtained in step (iv) to obtain a second lactide containing condensate fraction.

8. A process according to claim 6, wherein the bottom vapour fraction and/or the second lactide containing condensate comprise at least 99 wt.%, preferably at least 99.5 wt.%, lactide.

9. A process according to claim 6, wherein the bottom liquid fraction is recycled to the reactor.

10. A process according to claim 1, said process further comprising the step of removing carboxylic acid and/or hydroxyl containing compounds in any of the lactide comprising fractions obtained in step (d).
11. A process according to claim 10, wherein said removing carboxylic acid and/or hydroxyl containing compounds in the lactide fraction obtained in step (d) comprises the steps of:
- I. contacting any of the lactide comprising fractions obtained in step (d) with a solid scavenger material comprising at least one functional moiety capable of forming a covalent bond with one or more carboxylic acid and/or hydroxyl containing compounds optionally present in said lactide comprising fraction, thereby allowing the at least one functional moiety of the scavenger material to selectively react with the one or more carboxylic acid and/or hydroxyl containing compounds optionally present in said lactide comprising fraction to form a covalent bond therewith;
 - II. separating the scavenger material with bound carboxylic acid and/or hydroxyl containing compounds from the lactide comprising fraction to obtain a substantially purified lactide comprising fraction.
12. A process according to claim 11, wherein the at least one functional moiety of the solid scavenger material is selected from the group, consisting of epoxy, amine, amide, cyano and anhydride moieties.
13. A process according to claim 1, that is conducted in a continuous manner.
14. A process according to claim 1, that is conducted under reduced pressure.
15. A process according to claim 1, that is conducted under pressures in the range of 10-100 mbar.

16. A process according to claim 6, said process further comprising the step of removing carboxylic acid and/or hydroxyl containing compounds in any of the lactide comprising fractions obtained in step (iv) or (v).

17. A process according to claim 7, said process further comprising the step of removing carboxylic acid and/or hydroxyl containing compounds in any of the lactide comprising fractions obtained in step (vi).

18. A process according to claim 16, wherein said removing carboxylic acid and/or hydroxyl containing compounds in the lactide fraction obtained in step (iv) or (v) comprises the steps of:

- I. contacting any of the lactide comprising fractions obtained in step (iv) or (v) with a solid scavenger material comprising at least one functional moiety capable of forming a covalent bond with one or more carboxylic acid and/or hydroxyl containing compounds optionally present in said lactide comprising fraction, thereby allowing the at least one functional moiety of the scavenger material to selectively react with the one or more carboxylic acid and/or hydroxyl containing compounds optionally present in said lactide comprising fraction to form a covalent bond therewith;
- II. separating the scavenger material with bound carboxylic acid and/or hydroxyl containing compounds from the lactide comprising fraction to obtain a substantially purified lactide comprising fraction.

19. A process according to claim 17, wherein said removing carboxylic acid and/or hydroxyl containing compounds in the lactide fraction obtained in step (vi) comprises the steps of:

- I. contacting any of the lactide comprising fractions obtained in step (vi) with a solid scavenger material comprising at least one functional moiety capable of forming a covalent bond with one or more carboxylic acid and/or hydroxyl containing compounds optionally present in said lactide comprising fraction, thereby allowing the at least one functional moiety of the scavenger material to selectively react with the one or more carboxylic acid and/or hydroxyl containing

compounds optionally present in said lactide comprising fraction to form a covalent bond therewith;

- II. separating the scavenger material with bound carboxylic acid and/or hydroxyl containing compounds from the lactide comprising fraction to obtain a substantially purified lactide comprising fraction.

20. A process according to claim 18, wherein the at least one functional moiety of the solid scavenger material is selected from the group, consisting of epoxy, amine, amide, cyano and anhydride moieties.

21. A process according to claim 19, wherein the at least one functional moiety of the solid scavenger material is selected from the group, consisting of epoxy, amine, amide, cyano and anhydride moieties.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.